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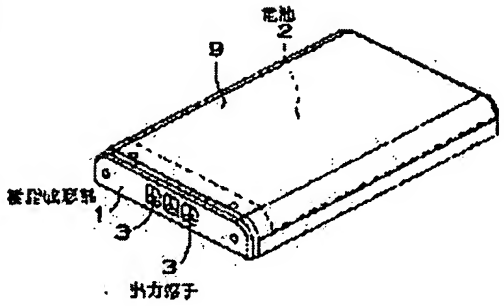
(54) BATTERY PACK AND MANUFACTURING METHOD THEREFOR

(57)Abstract:
PROBLEM TO BE SOLVED: To insert output terminals into accurate positions of a resin-molded part.
SOLUTION: This battery pack has a battery 2, output terminals 3 leading out electrodes 2C of the battery 2, and a molded holder 4 connected to the battery 2 and retaining the output terminals 3. In the battery pack, at least a connection part of the battery 2 and the molded holder 4 is insert-molded in the resin-mold 1. The resin-mold 1 exposes the surfaces of the output terminals 3 and integrally connects the battery 2, the output terminals 3 and the mold holder 4.



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CLAIMS

[Claim(s)]
[Claim 1] While connecting with a cell (2), and the output terminal (3) which takes out the electrode (2C) of this cell (2) and a cell (2) It has a shaping electrode holder (4) holding an output terminal (3). While carrying out insert molding of the connection section of a cell (2) and a shaping electrode holder (4) to the resin shaping section (1) at least The resin shaping section (1) is a pack cell characterized by exposing the front face of an output terminal (3) and making it come in one to connect a shaping electrode holder (4) with a cell (2) and an output terminal (3).
[Claim 2] The pack cell indicated by claim 1 to which it is fixed to a printed circuit board (5), and the output terminal (3) is arranging the shaping electrode holder (4) between this printed circuit board (5) and cell (2).
[Claim 3] A printed circuit board (5) is arranged in the end face of a cell (2), and parallel, and this printed circuit board (5) is connected with the electrode (2C) of the positive/negative of a cell (2) through a lead plate (7). The pack cell indicated by claim 2 which a shaping electrode holder (4) fastens between a printed circuit board (5) and a cell (2), is held, and comes to carry out insert molding of a printed circuit board (5), and a shaping electrode holder (4) and the edge of a cell (2) to the resin shaping section (1).
[Claim 4] The pack cell indicated by claim 1 to which it consists of the edge covering section (1A) arranged in the location where the resin shaping section (1) covers the both ends of a cell (2), and the connection section (1B) which connects the edge covering section (1A) arranged in the both ends of a cell (2), and the connection section (1B) is located in the corner section of the sheathing can (2A) of a cell (2).
[Claim 5] The pack cell indicated by claim 4 to which the sheathing can (2A) of a cell (2) has beveled the corner section, and the connection section (1B) is located in this beveled corner section.
[Claim 6] While connecting with a cell (2), and the output terminal (3) which takes out the electrode (2C) of this cell (2) and a cell (2) Are the manufacture approach of a pack cell equipped with the shaping electrode holder (4) holding an output terminal (3), and the temporary stop of a shaping electrode holder (4), and an output terminal (3) and a cell (2) is carried out to metal mold (10). While pouring the synthetic resin of a melting condition into the shaping room (11) of metal mold (10) and carrying out insert molding of the connection section of a cell (2) and a shaping electrode holder (4) to the resin shaping section (1) fabricated with metal mold (10) at least The manufacture approach of the pack cell which fabricates and becomes so that the front face of an output terminal (3) may be exposed from the resin shaping section (1) and a shaping electrode holder (4) may be made to connect with a cell (2) and an output terminal (3) in one in the resin shaping section (1).
[Claim 7] The manufacture approach of the pack cell indicated by claim 6 which fixes an output terminal (3) to a printed circuit board (5), arranges a shaping electrode holder (4) between this printed circuit board (5) and cell (2), and carries out insert molding to the resin shaping section (1).
[Claim 8] Arrange a printed circuit board (5) in the end face of a cell (2), and parallel, and this printed circuit board (5) is connected with the electrode (2C) of the positive/negative of a cell (2) through a lead plate (7). Between a printed circuit board (5) and a cell (2), fasten a shaping electrode holder (4), and a temporary stop is carried out to metal mold (10). The manufacture approach of the pack cell indicated by claim 7 which pours the synthetic resin of a melting condition into the shaping room (11) of metal mold (10), and inserts a printed circuit board (5), and a shaping electrode holder (4) and the edge of a cell (2) to the resin shaping section (1).
[Claim 9] The edge covering section arranged in the location which covers the both ends of a cell (2) (1A), The resin shaping section (1) which consists of the connection section (1B) which connects the edge covering section (1A) arranged in the both ends of a cell (2) is fabricated with metal mold (10). The manufacture approach of the pack cell indicated by claim 6 fabricated so that the connection section (1B)

may be located in the corner section of the sheathing can (2A) of a cell (2).
[Claim 10] The manufacture approach of the pack cell indicated by claim 9 which fabricates the connection section (1B) of the resin shaping section (1) so that the temporary stop of the cell (2) which comes to bevel the corner section of a sheathing can (2A) may be carried out to the shaping room (11) of metal mold (10) and it may be located in the corner section of the beveled sheathing can (2A).

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] About the manufacture approach of a pack cell, this invention is the process which fabricates the sheathing case made from plastics especially, and relates to the pack cell which comes to carry out insert molding of a cell and the output terminal, and its manufacture approach.
[0002]
[Description of the Prior Art] The sheathing case of a pack cell is made into the resin shaping section, and the pack cell which comes to insert a cell to this is developed. This pack cell is indicated by JP,2000-315483,A. As shown in drawing 1 , when fabricating the resin shaping section used as a sheathing case, this pack cell inserts a printed circuit board 5 and a cell 2, and is fixed. It is not necessary to put a cell and a printed circuit board into the case currently fabricated independently, and this pack cell does not need to assemble them like the conventional pack cell. At the process which fabricates the resin shaping section used as a case, it fixes to an orientation and the high production of a printed circuit board or the cell can be carried out cheaply.
[0003]
[Problem(s) to be Solved by the Invention] However, as it is actually shown in drawing 1 , when high production of the pack cell is carried out, there is a fault to which a yield worsens. That is because it is difficult to fabricate the resin shaping section in an exact configuration. Especially as for the pack cell which has inserted the printed circuit board 5 to the resin shaping section, the dimension error of a printed circuit board 5 makes shaping difficult. Although the temporary stop of the printed circuit board 5 is carried out to the shaping room 11 and it is inserted to the resin shaping section, the printed circuit board 5 which has an error in a dimension cannot carry out a temporary stop to the exact location of metal mold 10. It is because the temporary stop of the printed circuit board 5 is carried out to the orientation of the shaping room 11 with the structure attached or fastened to metal mold 10. The metal mold 10 which attaches or fastens a printed circuit board 5, and carries out a temporary stop to the shaping room 11 is designed so that it may attach or fasten and the temporary stop of the printed circuit board of the upper limit can be carried out. For this reason, the temporary stop of the printed circuit board smaller than the upper limit cannot be carried out to an exact location, and a temporary stop cannot be carried out firmly, either. A location further becomes easy to shift by the melting resin by which the printed circuit board by which a temporary stop is not firmly carried out to a shaping room is poured into a shaping room. For this reason, there is a fault from which the location which inserts a printed circuit board shifts. Furthermore, an output terminal is fixed to a printed circuit board, and if it is in the pack cell which makes the exterior of the resin shaping section express this output terminal, there is evil to which resin adheres on the surface of an output terminal. As shown in the sectional view of drawing 2 , it is necessary to stick without a clearance the metal mold which fabricates the resin shaping section which makes the exterior of the resin shaping section express an output terminal to the front face of an output terminal 3 in an expressional part. If a clearance is made here, as the chain line of drawing 2 shows, resin 14 will invade between an output terminal 3 and metal mold 10, and an output terminal 3 will be covered. Since especially injection molding with high manufacture efficiency pours melting synthetic resin into the shaping room 11 by the very high pressure, melting resin 14 trespasses also upon few clearances, and it reduces a yield. The pack cell to which resin adhered on the surface of the output terminal cannot connect an output terminal to the power supply terminal of an electrical machinery and apparatus, but serves as a defective.
[0004] The pack cell which cannot insert a printed circuit board etc. to an exact location connects the connector 16 equipped with an output terminal at the tip of lead wire 15 without laying an output terminal under the resin shaping section, as shown in drawing 1 . An output terminal is not laid under the resin

shaping section, and the pack cell of this structure can make a yield high. However, in order to connect lead wire 15, manufacture not only takes time and effort, but the temporary stop of metal mold 10 takes time and effort. It is in the condition which pulls out lead wire 15 to the exterior of metal mold 10, and is because a temporary stop is carried out to the shaping room 11. Furthermore, this pack cell also has the fault which lead wire tends to disconnect. Moreover, the pack cell which has lead wire needs the tooth space in which lead wire and a connector are made to build for the electrical machinery and apparatus equipped with this, and also has the fault to which the storage space of a pack cell becomes large.
[0005] This invention is developed for the purpose of solving such a fault. The important purpose of this invention is to offer the pack cell which can insert an output terminal to the exact location of the resin shaping section, and its manufacture approach.
[0006]
[Means for Solving the Problem] The pack cell of this invention is equipped with the shaping electrode holder 4 holding an output terminal 3 while it is connected with a cell 2 with the output terminal 3 which takes out electrode 2C of a cell 2 and this cell 2. The pack cell is carrying out insert molding of the connection section of a cell 2 and the shaping electrode holder 4 to the resin shaping section 1 at least. The resin shaping section 1 has connected the cell 2, the output terminal 3, and the shaping electrode holder 4 in one while exposing the front face of an output terminal 3.
[0007] Preferably, the pack cell of this invention fixes an output terminal 3 to a printed circuit board 5, and arranges the shaping electrode holder 4 between this printed circuit board 5 and cell 2. A printed circuit board 5 can be arranged in parallel with the end face of a cell 2. This printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the lead plate 7. This pack cell fastens and holds the shaping electrode holder 4 between a printed circuit board 5 and a cell 2, and carries out insert molding of a printed circuit board 5, the shaping electrode holder 4, and the edge of a cell 2 to the resin shaping section 1.
[0008] The resin shaping section 1 is equipped with connection section 1B which connects edge covering section 1A preferably arranged in the location which covers the both ends of a cell 2, and edge covering section 1A arranged in the both ends of a cell 2. Connection section 1B can be located in the corner section of sheathing can 2A of a cell 2. Furthermore, sheathing can 2A of a cell 2 can bevel the corner section, and can locate connection section 1B in this beveled corner section.
[0009] The manufacture approach of this invention manufactures a pack cell equipped with the shaping electrode holder 4 holding an output terminal 3 while being connected with a cell 2 with a cell 2 and the output terminal 3 which takes out electrode 2C of this cell 2. This manufacture approach carries out the temporary stop of the shaping electrode holder 4, an output terminal 3, and the cell 2 to metal mold 10, and pours the synthetic resin of a melting condition into the shaping room 11 of metal mold 10. Furthermore, this manufacture approach exposes the front face of an output terminal 3 from the resin shaping section 1, and it is fabricated so that a cell 2, an output terminal 3, and the shaping electrode holder 4 may be made to connect in one in the resin shaping section 1, while carrying out insert molding of the connection section of a cell 2 and the shaping electrode holder 4 to the resin shaping section 1 fabricated with metal mold 10 at least.
[0010] The manufacture approach of this invention can fix an output terminal 3 to a printed circuit board 5, can arrange the shaping electrode holder 4 between this printed circuit board 5 and cell 2, and it can carry out insert molding to the resin shaping section 1. A printed circuit board 5 can be arranged in the end face of a cell 2, and parallel, and can connect this printed circuit board 5 with electrode 2C of the positive/negative of a cell 2 through the lead plate 7. The shaping electrode holder 4 is fastened between a printed circuit board 5 and a cell 2, a temporary stop is carried out to metal mold 10, the synthetic resin of a melting condition is poured into the shaping room 11 of metal mold 10, and a printed circuit board 5, the shaping electrode holder 4, and the edge of a cell 2 are inserted to the resin shaping section 1.
[0011] Furthermore, the manufacture approach of this invention can fabricate the resin shaping section 1 which consists of connection section 1B which connects edge covering section 1A arranged in the location which covers the both ends of a cell 2, and edge covering section 1A arranged in the both ends of a cell 2 with metal mold 10. Preferably, this resin shaping section 1 is fabricated so that connection section 1B may be located in the corner section of sheathing can 2A of a cell 2. This resin shaping section 1 carries out the temporary stop of the cell 2 which comes to bevel the corner section of sheathing can 2A to the shaping room 11 of metal mold 10, is located in the corner section of beveled sheathing can 2A, and can fabricate connection section 1B.
[0012]
[Embodiment of the Invention] Hereafter, the example of this invention is explained based on a drawing. However, the example shown below does not illustrate the pack cell and its manufacture approach for materializing the technical thought of this invention, and this invention does not specify a pack cell and its

manufacture approach as the following.
[0013] Furthermore, this specification has appended the number corresponding to the member shown in an example to the member shown in "the column of a claim", and "the column of The means for solving a technical problem" so that it may be easy to understand a claim. However, there is never nothing what specifies the member shown in a claim as the member of an example.
[0014] The pack cell shown in drawing 3 thru/or drawing 6 carries out insert molding of a cell 2, the shaping electrode holder 4, and the output terminal 3 to the resin shaping section 1, and is fixed. Drawing 4 and drawing 6 show the perspective view which disassembled the parts with which the pack cell of drawing 3 and drawing 5 is equipped. With these perspective views, in order to make the configuration of the resin shaping section 1 intelligible, the condition of having separated the resin shaping section 1 from other parts is shown. However, in an actual pack cell, since insert molding of each parts is carried out to the resin shaping section 1, as shown in drawing, it is not decomposed. Furthermore, this perspective view is shown in the condition of separating a printed circuit board 5, the shaping electrode holder 4, the PTC component 6, and a cell 2, in order to make intelligible each parts inserted to the resin shaping section 1. However, in the condition of having been assembled as a pack cell, the printed circuit board 5 which is fixing the output terminal 3, the shaping electrode holder 4 and the PTC component 6, and a cell 2 are inserted and fixed to the resin shaping section 1.
[0015] The pack cell shown in drawings, such as this, is equipped with the printed circuit board 5 which is fixing the output terminal 3 connected to a cell 2 and this cell 2, and the shaping electrode holder 4 which fixes an output terminal 3 to an orientation through this printed circuit board 5.
[0016] Cells 2 are rechargeable batteries which can be charged, such as a lithium ion battery, a nickel hydoride battery, and a nickel-cadmium battery. Furthermore, the cell 2 of drawing is a thin square shape cell, and is made into the configuration which beveled the corner section of the four corners of sheathing can 2A by making the both sides of sheathing can 2A into a curve side. When a lithium ion battery is used for a thin square shape cell, there are the features which can enlarge charge capacity to the capacity of the whole pack cell.
[0017] The pack cell of drawing is equipped with the shaping electrode holder 4 for carrying out the temporary stop of the output terminal 3 to the exact location of metal mold 10, and inserting to the resin shaping section 1. The shaping electrode holder 4 is fabricated with plastics independently [the resin shaping section 1]. This shaping electrode holder 4 arranges an output terminal 3 in the position of a cell 2, and is inserted to the resin shaping section 1. Since the pack cell of drawing is fixing the output terminal 3 to a printed circuit board 5, the shaping electrode holder 4 arranges a printed circuit board 5 in the position of a cell 2. This pack cell fixes an output terminal 3 to a printed circuit board 5, through a printed circuit board 5, inserts an output terminal 3 to the resin shaping section 1, and is fixing it to an orientation. Although not illustrated, the pack cell of this invention does not necessarily need to fix an output terminal to a printed circuit board. This pack cell arranges a shaping electrode holder between an output terminal and a cell, inserts an output terminal, a shaping electrode holder, and a cell to the resin shaping section, and fixes an output terminal to an orientation.
[0018] The printed circuit board 5 which is fixing the output terminal 3 also mounts the electronic parts (not shown) which realize the protection network of a cell 2. The printed circuit board 5 of drawing is shorter than the die length of obturation plate 2B of a thin square shape cell, and is made narrower than the width of face of obturation plate 2B. Obturation plate 2B is located in the edge of a cell 2. Therefore, the end shape of a cell 2 turns into a configuration of obturation plate 2B. An output terminal 3 solders and is fixed to a printed circuit board 5. Furthermore, the printed circuit board 5 is connected to electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7. The shaping electrode holder 4 is fastened between a printed circuit board 5 and a cell 2, and it is held in an orientation until it fabricates the resin shaping section 1.
[0019] The shaping electrode holder 4 carries out the temporary stop of the printed circuit board 5 and cell 2 which are fixing the output terminal 3 to the orientation of metal mold 10 while arranging an output terminal 3 in an orientation to a cell 2 through a printed circuit board 5. The shaping electrode holder 4 of drawing 4 separates a printed circuit board 5 from the end side of a cell 2, and arranges it in the end face of a cell and parallel which are obturation plate 2Bs. The shaping electrode holder 4 of this drawing is fabricating the whole configuration to tubed. The tubed shaping electrode holder 4 arranges peripheral wall 4A perpendicularly to obturation plate 2B, and supports a printed circuit board 5 to obturation plate 2B and parallel. The further tubed shaping electrode holder 4 makes width of face (W) and die length (L) equal to the appearance of a printed circuit board 5, and makes them the configuration inserted in the condition of being laid under the interior of the resin shaping section 1. The tubed shaping electrode holder 4 is fabricating middle connection section 4B in one further again into the central part currently fabricated to tubed [rectangular]. Middle connection section 4B has prepared the intussusceptum (located in a rear

face in drawing 4) which inserts the heights electrode of obturation plate 2B. This shaping electrode holder 4 puts a heights electrode into the intussusceptum, and can connect the shaping electrode holder 4 with the orientation of a cell 2.

[0020] Furthermore, the shaping electrode holder 4 of drawing is in the condition of making obturation plate 2B of a cell 2 contacting, and has formed the clearance 8 which makes plastics flow inside. Also inside this shaping electrode holder 4 pours in the plastics of the resin shaping section 1, and can insert it to the resin shaping section 1 firmly. However, the shaping electrode holder 4 does not necessarily need to pour the plastics of the resin shaping section 1 into the interior. The shaping electrode holder 4 of drawing has prepared the through tube (not shown) which makes the lead plate 7 fixed to the end of a printed circuit board 5 penetrate further again. The shaping electrode holder 4 of this configuration puts the lead plate 7 fixed to a printed circuit board 5 into a through tube, and can connect a printed circuit board 5 with an orientation.

[0021] The shaping electrode holder 4 of this configuration is fastened between a printed circuit board 5 and a cell 2, and arranges a printed circuit board 5 in the orientation of a cell 2. In the condition of fastening the shaping electrode holder 4, a printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7. If a printed circuit board 5 is connected with the PTC component 6 with the lead plate 7, the shaping electrode holder 4 currently fastened between a printed circuit board 5 and a cell 2 will be held in an orientation. Furthermore, it can paste up and a printed circuit board 5 can also certainly be fixed with the shaping electrode holder 4.

[0022] The shaping electrode holder 4 of drawing 6 arranges an output terminal 3 in the end face and perpendicular which are obturation plate 2B of a cell 2. This shaping electrode holder 4 is also fabricated to tubed, and supports a printed circuit board 5. However, this shaping electrode holder 4 is arranging in obturation plate 2B and parallel peripheral wall 4A fabricated by tubed. This shaping electrode holder 4 is made into the configuration which connects two cylinders in parallel by middle connection section 4B. Middle connection section 4B is between two cylinders, and has prepared intussusceptum 4C which inserts the heights electrode of obturation plate 2B above the middle connection section. The tubed shaping electrode holder 4 made high obturation plate 2B and peripheral wall 4A which counters, and has prevented the location gap of a printed circuit board 5. As for this shaping electrode holder 4, width of face (W) is specified in the height of peripheral wall 4A.

[0023] The shaping electrode holder 4 of this configuration also arranges a printed circuit board 5 in the orientation of a cell 2. If a printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7, a printed circuit board 5 will hold the shaping electrode holder 4 in an orientation. The shaping electrode holder 4 is inserted to the resin shaping section 1, and is fixed to an orientation. Therefore, a printed circuit board 5 just holds the shaping electrode holder 4 temporarily in an orientation until it fabricates the resin shaping section 1. However, it can paste up and a printed circuit board 5 can also be fixed to the shaping electrode holder 4.

[0024] The resin shaping section 1 is the process which fabricates synthetic resin, and inserts an output terminal 3, the shaping electrode holder 4, and a cell 2. An output terminal 3 is fixed to a printed circuit board 5. Therefore, the resin shaping section 1 inserts an output terminal 3 with a printed circuit board 5. The pack cell of drawing lays the whole cell 2 underground, and does not insert it to the resin shaping section 1. A cell 2 is inserted in the condition of sticking the front face by the side of a heights electrode in the resin shaping section 1. This pack cell has the features which can make an appearance small. However, a part of cell can be inserted so that it may twist and carry out and the whole may be mostly laid under the resin shaping section, and it can also be firmly used as the pack cell of tough structure.

[0025] The resin shaping section 1 of drawing 4 and drawing 6 consists of connection section 1B which connects edge covering section 1A arranged in the location which covers the both ends of a cell 2, and edge covering section 1A of a pair, and fabricates the whole in one. Insert molding of the edge covering section 1A located in the heights electrode, i.e., obturation plate 2B, side of a cell 2 is carried out in the condition of laying the edge of a printed circuit board 5, the shaping electrode holder 4, and a cell 2 underground. Edge covering section 1A located in the pars basilaris ossis occipitalis of sheathing can 2A is fabricated by the configuration which meets a periphery at the bottom in the pack cell of drawing 3 and drawing 4 , and is fabricated by the configuration which covers the whole surface at the bottom, i.e., a base configuration, in the pack cell of drawing 5 and drawing 6 .

[0026] Connection section 1B is located in the corner section of sheathing can 2A of a cell 2. The cell 2 of drawing 4 and drawing 6 is a thin square shape cell which beveled the corner section of sheathing can 2A, and is arranging connection section 1B in the corner section beveled and made. The pack cell of drawing 3 is arranging connection section 1B in the corner section which serves as the sheathing can 2A bottom in drawing, as shown in the sectional view of drawing 7 . The pack cell of drawing 5 is arranging connection section 1B in the corner section on sheathing can 2A, as shown in the sectional view of

drawing 8 . Connection section 1B is arranged in the corner section of beveled sheathing can 2A, without enlarging the appearance of a pack cell. Although the resin shaping section 1 shown in drawings, such as this, has connected edge covering section 1A of a pair by connection section of two 1B, it can prepare the connection section in the four corners of a sheathing can, and can also connect the edge covering section of a pair in the four connection sections.

[0027] The above pack cell is the following, and is made and manufactured.

(1) Fix the electronic parts (not shown) of an output terminal 3 and a protection network to a printed circuit board 5.

(2) Connect a printed circuit board 5 with a cell 2 through the lead plate 7 and the PTC component 6. The PTC component 6 is arranged between the shaping electrode holder 4 and a cell 2. Spot welding of the PTC component 6 and the lead plate 7 is carried out to the lead plate 7 which carried out spot welding of the end to the cell 2, connected it with it, and has connected the other end with the printed circuit board 5, and they are connected with it. When a printed circuit board 5 is connected with a cell 2, the shaping electrode holder 4 is arranged between a printed circuit board 5 and a cell 2. A printed circuit board 5 and a cell 2 do, and the shaping electrode holder 4 connects a printed circuit board 5 and a cell 2 with an exact relative position. At the above process, a printed circuit board 5, the shaping electrode holder 4, and a cell 2 are connected in one, and serve as cell assembly.

[0028] (3) Carry out [mold clamp] of the metal mold after setting cell assembly to the shaping room of metal mold. The metal mold 10 by which it was mold clamp carried out has the opening 12 for fabricating the resin shaping section 1, as shown in drawing 9 thru/or drawing 12 . The synthetic resin by which was heated and melting was carried out to this opening 12 is poured in, and the resin shaping section 1 is fabricated. The synthetic resin by which melting was carried out is poured in from inlet 10A by which opening was carried out to metal mold 10. Inlet 10A is opened for free passage and prepared in the opening 12 of the shaping room 11. Furthermore, metal mold 10 has the positioning heights 13 which carry out the temporary stop of the cell assembly to an orientation. The positioning heights 13 contact the front face of the shaping electrode holder 4 or a printed circuit board 5, and carry out the temporary stop of the cell assembly to an exact location.

[0029] Drawing 9 and drawing 10 show the sectional view of metal mold 10 which manufactures the pack cell of drawing 3 . Drawings, such as this, show the condition that the positioning heights 13 of metal mold 10 press the front face of the shaping electrode holder 4, and carry out a temporary stop to an orientation. The positioning heights 13 of drawings, such as this, fasten the shaping electrode holder 4 by the upper and lower sides, and prevent a location gap of the upper and lower sides. Furthermore, the shaping electrode holder 4 makes an upper square corner contact the inside of the corner section of metal mold 10, as shown in drawing 10 , and a gap of a longitudinal direction is prevented. The metal mold 10 of drawing makes the bottom of a cell 2 contact the inside of the shaping room 11 of metal mold 10, and prevents a location gap of the lengthwise direction of cell assembly further again while it presses the front face of an output terminal 3 by the positioning heights 13. The positioning heights 13 which press the front face of an output terminal 3 make the exterior of the resin shaping section 1 express an output terminal 3.

[0030] Drawing 11 and drawing 12 show the sectional view of metal mold 10 which manufactures the pack cell of drawing 5 . The positioning heights 13 of metal mold 10 press the front face of an output terminal 3, and drawings, such as this, show the condition of carrying out the temporary stop of the shaping electrode holder 4 to a printed circuit board 5 in an orientation. The metal mold 10 of drawings, such as this, makes the inferior surface of tongue of the shaping electrode holder 4 contact the inside of the shaping room 11 of metal mold 10, and prevents a location gap of the vertical direction of a printed circuit board 5 and the shaping electrode holder 4 while it presses the front face of an output terminal 3 by the positioning heights 13. Furthermore, as the shaping electrode holder 4 is shown in drawing 12 , the lower square corner section serves as a configuration in alignment with the inside of the corner section of metal mold 10, and a location gap of a longitudinal direction is prevented. The positioning heights 13 which press the top face of a printed circuit board 5 press the front face of an output terminal 3, and make the exterior of the resin shaping section 1 express an output terminal 3. The metal mold 10 of drawing 11 presses the bottom of a cell 2 by the positioning heights 13 of metal mold 10, and prevents a location gap of the lengthwise direction of cell assembly further again while it makes lobe 4D which projects from the apical surface of the shaping electrode holder 4 contact the inside of the shaping room 11 of metal mold 10.

[0031] (4) Press fit the synthetic resin by which melting was heated and carried out to the shaping room 11. Melting synthetic resin trespasses upon the opening 12 of the shaping room 11, and the resin shaping section 1 is fabricated. The fabricated resin shaping section 1 is fabricated in one by the configuration which has connected edge covering section 1A by connection section 1B. One edge covering section 1A inserts a printed circuit board 5, the shaping electrode holder 4, and a cell 2, and fixes them to an orientation. Preferably, edge covering section 1A which inserts the shaping electrode holder 4 and is fixed

trespasses upon the interior of the tubed shaping electrode holder 4, and fixes the shaping electrode holder 4 firmly. In order to pour the synthetic resin of edge covering section 1A into the interior of the shaping electrode holder 4, the clearance 8 which shows the shaping electrode holder 4 to melting synthetic resin inside is formed. However, it is not necessary to make melting synthetic resin not necessarily trespass upon the interior of a shaping electrode holder. The metal mold 10 of drawing 9 and drawing 11 fabricates edge covering section 1A so that it may become both sides of a cell 2, and the same flat surface. The whole thickness is made as for the pack cell which fabricates the resin shaping section 1 with this metal mold 10, and is manufactured to the same thinness as a cell 2. However, metal mold can also be fabricated in the condition of laying a cell under the resin shaping section. This metal mold carries out the temporary stop of the cell to an orientation by positioning heights, and fabricates the resin shaping section.

[0032] (5) At the above process, cell assembly inserts an output terminal 3, a printed circuit board 5, the shaping electrode holder 4, and a cell 2 to the resin shaping section 1, and fixes them to an orientation. Then, it becomes the pack cell which covered the front face of this cell assembly with the tube 9, and was completed. Heat-shrinkable tubing is used for a tube 9. After heat-shrinkable tubing puts in cell assembly, it heats and contracts and it is stuck on the front face of cell assembly.

[0033]

[Effect of the Invention] The pack cell and its manufacture approach of this invention have the features which can insert an output terminal to the exact location of the resin shaping section. It is because the pack cell and its manufacture approach of this invention connect an output terminal with a cell through the shaping electrode holder with which the resin shaping section was fabricated independently and it is carrying out insert molding of a shaping electrode holder, an output terminal, and the cell to the resin shaping section. A shaping electrode holder can be fabricated in a very high precision compared with the sheathing can of a cell etc. For this reason, the structure which connects an output terminal with a cell through a shaping electrode holder is insertable to the resin shaping section, arranging an output terminal in the exact location of a cell. Thus, when fabricating the resin shaping section, resin invades between an output terminal and metal mold, and the pack cell and its manufacture approach of this invention which can insert an output terminal to the exact location of the resin shaping section prevent effectively that the front face of an output terminal is covered, and can make a yield high.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] About the manufacture approach of a pack cell, this invention is the process which fabricates the sheathing case made from plastics especially, and relates to the pack cell which comes to carry out insert molding of a cell and the output terminal, and its manufacture approach.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] The sheathing case of a pack cell is made into the resin shaping section, and the pack cell which comes to insert a cell to this is developed. This pack cell is indicated by JP,2000-315483,A. As shown in drawing 1 , when fabricating the resin shaping section used as a sheathing case, this pack cell inserts a printed circuit board 5 and a cell 2, and is fixed. It is not necessary to put a cell and a printed circuit board into the case currently fabricated independently, and this pack cell does not need to assemble them like the conventional pack cell. At the process which fabricates the resin shaping section used as a case, it fixes to an orientation and the high production of a printed circuit board or the cell can be carried out cheaply.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] The pack cell and its manufacture approach of this invention have the features which can insert an output terminal to the exact location of the resin shaping section. It is because the pack cell and its manufacture approach of this invention connect an output terminal with a cell through the shaping electrode holder with which the resin shaping section was fabricated independently and it is carrying out insert molding of a shaping electrode holder, an output terminal, and the cell to the resin shaping section. A shaping electrode holder can be fabricated in a very high precision compared with the sheathing can of a cell etc. For this reason, the structure which connects an output terminal with a cell through a shaping electrode holder is insertable to the resin shaping section, arranging an output terminal in the exact location of a cell. Thus, when fabricating the resin shaping section, resin invades between an output terminal and metal mold, and the pack cell and its manufacture approach of this invention which can insert an output terminal to the exact location of the resin shaping section prevent effectively that the front face of an output terminal is covered, and can make a yield high.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, as it is actually shown in drawing 1 , when high production of the pack cell is carried out, there is a fault to which a yield worsens. That is because it is difficult to fabricate the resin shaping section in an exact configuration. Especially as for the pack cell which has inserted the printed circuit board 5 to the resin shaping section, the dimension error of a printed circuit board 5 makes shaping difficult. Although the temporary stop of the printed circuit board 5 is carried out to the shaping room 11 and it is inserted to the resin shaping section, the printed circuit board 5 which has an error in a dimension cannot carry out a temporary stop to the exact location of metal mold 10. It is because the temporary stop of the printed circuit board 5 is carried out to the orientation of the shaping room 11 with the structure attached or fastened to metal mold 10. The metal mold 10 which attaches or fastens a printed circuit board 5, and carries out a temporary stop to the shaping room 11 is designed so that it may attach or fasten and the temporary stop of the printed circuit board of the upper limit can be carried out. For this reason, the temporary stop of the printed circuit board smaller than the upper limit cannot be carried out to an exact location, and a temporary stop cannot be carried out firmly, either. A location further becomes easy to shift by the melting resin by which the printed circuit board by which a temporary stop is not firmly carried out to a shaping room is poured into a shaping room. For this reason, there is a fault from which the location which inserts a printed circuit board shifts. Furthermore, an output terminal is fixed to a printed circuit board, and if it is in the pack cell which makes the exterior of the resin shaping section express this output terminal, there is evil to which resin adheres on the surface of an output terminal. As shown in the sectional view of drawing 2 , it is necessary to stick without a clearance the metal mold which fabricates the resin shaping section which makes the exterior of the resin shaping section express an output terminal to the front face of an output terminal 3 in an expressional part. If a clearance is made here, as the chain line of drawing 2 shows, resin 14 will invade between an output terminal 3 and metal mold 10, and an output terminal 3 will be covered. Since especially injection molding with high manufacture efficiency pours melting synthetic resin into the shaping room 11 by the very high pressure, melting resin 14 trespasses also upon few clearances, and it reduces a yield. The pack cell to which resin adhered on the surface of the output terminal cannot connect an output terminal to the power supply terminal of an electrical machinery and apparatus, but serves as a defective.
[0004] The pack cell which cannot insert a printed circuit board etc. to an exact location connects the connector 16 equipped with an output terminal at the tip of lead wire 15 without laying an output terminal under the resin shaping section, as shown in drawing 1 . An output terminal is not laid under the resin shaping section, and the pack cell of this structure can make a yield high. However, in order to connect lead wire 15, manufacture not only takes time and effort, but the temporary stop of metal mold 10 takes time and effort. It is in the condition which pulls out lead wire 15 to the exterior of metal mold 10, and is because a temporary stop is carried out to the shaping room 11. Furthermore, this pack cell also has the fault which lead wire tends to disconnect. Moreover, the pack cell which has lead wire needs the tooth space in which lead wire and a connector are made to build for the electrical machinery and apparatus equipped with this, and also has the fault to which the storage space of a pack cell becomes large.
[0005] This invention is developed for the purpose of solving such a fault. The important purpose of this invention is to offer the pack cell which can insert an output terminal to the exact location of the resin shaping section, and its manufacture approach.

[Translation done.]

MEANS

[Means for Solving the Problem] The pack cell of this invention is equipped with the shaping electrode holder 4 holding an output terminal 3 while it is connected with a cell 2 with the output terminal 3 which takes out electrode 2C of a cell 2 and this cell 2. The pack cell is carrying out insert molding of the connection section of a cell 2 and the shaping electrode holder 4 to the resin shaping section 1 at least. The resin shaping section 1 has connected the cell 2, the output terminal 3, and the shaping electrode holder 4 in one while exposing the front face of an output terminal 3.
[0007] Preferably, the pack cell of this invention fixes an output terminal 3 to a printed circuit board 5, and arranges the shaping electrode holder 4 between this printed circuit board 5 and cell 2. A printed circuit board 5 can be arranged in parallel with the end face of a cell 2. This printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the lead plate 7. This pack cell fastens and holds the shaping electrode holder 4 between a printed circuit board 5 and a cell 2, and carries out insert molding of a printed circuit board 5, the shaping electrode holder 4, and the edge of a cell 2 to the resin shaping section 1.
[0008] The resin shaping section 1 is equipped with connection section 1B which connects edge covering section 1A preferably arranged in the location which covers the both ends of a cell 2, and edge covering section 1A arranged in the both ends of a cell 2. Connection section 1B can be located in the corner section of sheathing can 2A of a cell 2. Furthermore, sheathing can 2A of a cell 2 can bevel the corner section, and can locate connection section 1B in this beveled corner section.
[0009] The manufacture approach of this invention manufactures a pack cell equipped with the shaping electrode holder 4 holding an output terminal 3 while being connected with a cell 2 with a cell 2 and the output terminal 3 which takes out electrode 2C of this cell 2. This manufacture approach carries out the temporary stop of the shaping electrode holder 4, an output terminal 3, and the cell 2 to metal mold 10, and pours the synthetic resin of a melting condition into the shaping room 11 of metal mold 10. Furthermore, this manufacture approach exposes the front face of an output terminal 3 from the resin shaping section 1, and it is fabricated so that a cell 2, an output terminal 3, and the shaping electrode holder 4 may be made to connect in one in the resin shaping section 1, while carrying out insert molding of the connection section of a cell 2 and the shaping electrode holder 4 to the resin shaping section 1 fabricated with metal mold 10 at least.
[0010] The manufacture approach of this invention can fix an output terminal 3 to a printed circuit board 5, can arrange the shaping electrode holder 4 between this printed circuit board 5 and cell 2, and it can carry out insert molding to the resin shaping section 1. A printed circuit board 5 can be arranged in the end face of a cell 2, and parallel, and can connect this printed circuit board 5 with electrode 2C of the positive/negative of a cell 2 through the lead plate 7. The shaping electrode holder 4 is fastened between a printed circuit board 5 and a cell 2, a temporary stop is carried out to metal mold 10, the synthetic resin of a melting condition is poured into the shaping room 11 of metal mold 10, and a printed circuit board 5, the shaping electrode holder 4, and the edge of a cell 2 are inserted to the resin shaping section 1.
[0011] Furthermore, the manufacture approach of this invention can fabricate the resin shaping section 1 which consists of connection section 1B which connects edge covering section 1A arranged in the location which covers the both ends of a cell 2, and edge covering section 1A arranged in the both ends of a cell 2 with metal mold 10. Preferably, this resin shaping section 1 is fabricated so that connection section 1B may be located in the corner section of sheathing can 2A of a cell 2. This resin shaping section 1 carries out the temporary stop of the cell 2 which comes to bevel the corner section of sheathing can 2A to the shaping room 11 of metal mold 10, is located in the corner section of beveled sheathing can 2A, and can fabricate connection section 1B.
[0012]

[Embodiment of the Invention] Hereafter, the example of this invention is explained based on a drawing. However, the example shown below does not illustrate the pack cell and its manufacture approach for materializing the technical thought of this invention, and this invention does not specify a pack cell and its manufacture approach as the following.

[0013] Furthermore, this specification has appended the number corresponding to the member shown in an example to the member shown in "the column of a claim", and "the column of The means for solving a technical problem" so that it may be easy to understand a claim. However, there is never nothing what specifies the member shown in a claim as the member of an example.

[0014] The pack cell shown in drawing 3 thru/or drawing 6 carries out insert molding of a cell 2, the shaping electrode holder 4, and the output terminal 3 to the resin shaping section 1, and is fixed. Drawing 4 and drawing 6 show the perspective view which disassembled the parts with which the pack cell of drawing 3 and drawing 5 is equipped. With these perspective views, in order to make the configuration of the resin shaping section 1 intelligible, the condition of having separated the resin shaping section 1 from other parts is shown. However, in an actual pack cell, since insert molding of each parts is carried out to the resin shaping section 1, as shown in drawing, it is not decomposed. Furthermore, this perspective view is shown in the condition of separating a printed circuit board 5, the shaping electrode holder 4, the PTC component 6, and a cell 2, in order to make intelligible each parts inserted to the resin shaping section 1. However, in the condition of having been assembled as a pack cell, the printed circuit board 5 which is fixing the output terminal 3, the shaping electrode holder 4 and the PTC component 6, and a cell 2 are inserted and fixed to the resin shaping section 1.

[0015] The pack cell shown in drawings, such as this, is equipped with the printed circuit board 5 which is fixing the output terminal 3 connected to a cell 2 and this cell 2, and the shaping electrode holder 4 which fixes an output terminal 3 to an orientation through this printed circuit board 5.

[0016] Cells 2 are rechargeable batteries which can be charged, such as a lithium ion battery, a nickel hydoride battery, and a nickel-cadmium battery. Furthermore, the cell 2 of drawing is a thin square shape cell, and is made into the configuration which beveled the corner section of the four corners of sheathing can 2A by making the both sides of sheathing can 2A into a curve side. When a lithium ion battery is used for a thin square shape cell, there are the features which can enlarge charge capacity to the capacity of the whole pack cell.

[0017] The pack cell of drawing is equipped with the shaping electrode holder 4 for carrying out the temporary stop of the output terminal 3 to the exact location of metal mold 10, and inserting to the resin shaping section 1. The shaping electrode holder 4 is fabricated with plastics independently [the resin shaping section 1]. This shaping electrode holder 4 arranges an output terminal 3 in the position of a cell 2, and is inserted to the resin shaping section 1. Since the pack cell of drawing is fixing the output terminal 3 to a printed circuit board 5, the shaping electrode holder 4 arranges a printed circuit board 5 in the position of a cell 2. This pack cell fixes an output terminal 3 to a printed circuit board 5, through a printed circuit board 5, inserts an output terminal 3 to the resin shaping section 1, and is fixing it to an orientation. Although not illustrated, the pack cell of this invention does not necessarily need to fix an output terminal to a printed circuit board. This pack cell arranges a shaping electrode holder between an output terminal and a cell, inserts an output terminal, a shaping electrode holder, and a cell to the resin shaping section, and fixes an output terminal to an orientation.

[0018] The printed circuit board 5 which is fixing the output terminal 3 also mounts the electronic parts (not shown) which realize the protection network of a cell 2. The printed circuit board 5 of drawing is shorter than the die length of obturation plate 2B of a thin square shape cell, and is made narrower than the width of face of obturation plate 2B. Obturation plate 2B is located in the edge of a cell 2. Therefore, the end shape of a cell 2 turns into a configuration of obturation plate 2B. An output terminal 3 solders and is fixed to a printed circuit board 5. Furthermore, the printed circuit board 5 is connected to electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7. The shaping electrode holder 4 is fastened between a printed circuit board 5 and a cell 2, and it is held in an orientation until it fabricates the resin shaping section 1.

[0019] The shaping electrode holder 4 carries out the temporary stop of the printed circuit board 5 and cell 2 which are fixing the output terminal 3 to the orientation of metal mold 10 while arranging an output terminal 3 in an orientation to a cell 2 through a printed circuit board 5. The shaping electrode holder 4 of drawing 4 separates a printed circuit board 5 from the end side of a cell 2, and arranges it in the end face of a cell and parallel which are obturation plate 2Bs. The shaping electrode holder 4 of this drawing is fabricating the whole configuration to tubed. The tubed shaping electrode holder 4 arranges peripheral wall 4A perpendicularly to obturation plate 2B, and supports a printed circuit board 5 to obturation plate 2B and parallel. The further tubed shaping electrode holder 4 makes width of face (W) and die length (L) equal to the appearance of a printed circuit board 5, and makes them the configuration inserted in the condition of

being laid under the interior of the resin shaping section 1. The tubed shaping electrode holder 4 is fabricating middle connection section 4B in one further again into the central part currently fabricated to tubed [rectangular]. Middle connection section 4B has prepared the intussusceptum (located in a rear face in drawing 4) which inserts the heights electrode of obturation plate 2B. This shaping electrode holder 4 puts a heights electrode into the intussusceptum, and can connect the shaping electrode holder 4 with the orientation of a cell 2.

[0020] Furthermore, the shaping electrode holder 4 of drawing is in the condition of making obturation plate 2B of a cell 2 contacting, and has formed the clearance 8 which makes plastics flow inside. Also inside this shaping electrode holder 4 pours in the plastics of the resin shaping section 1, and can insert it to the resin shaping section 1 firmly. However, the shaping electrode holder 4 does not necessarily need to pour the plastics of the resin shaping section 1 into the interior. The shaping electrode holder 4 of drawing has prepared the through tube (not shown) which makes the lead plate 7 fixed to the end of a printed circuit board 5 penetrate further again. The shaping electrode holder 4 of this configuration puts the lead plate 7 fixed to a printed circuit board 5 into a through tube, and can connect a printed circuit board 5 with an orientation.

[0021] The shaping electrode holder 4 of this configuration is fastened between a printed circuit board 5 and a cell 2, and arranges a printed circuit board 5 in the orientation of a cell 2. In the condition of fastening the shaping electrode holder 4, a printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7. If a printed circuit board 5 is connected with the PTC component 6 with the lead plate 7, the shaping electrode holder 4 currently fastened between a printed circuit board 5 and a cell 2 will be held in an orientation. Furthermore, it can paste up and a printed circuit board 5 can also certainly be fixed with the shaping electrode holder 4.

[0022] The shaping electrode holder 4 of drawing 6 arranges an output terminal 3 in the end face and perpendicular which are obturation plate 2B of a cell 2. This shaping electrode holder 4 is also fabricated to tubed, and supports a printed circuit board 5. However, this shaping electrode holder 4 is arranging in obturation plate 2B and parallel peripheral wall 4A fabricated by tubed. This shaping electrode holder 4 is made into the configuration which connects two cylinders in parallel by middle connection section 4B. Middle connection section 4B is between two cylinders, and has prepared intussusceptum 4C which inserts the heights electrode of obturation plate 2B above the middle connection section. The tubed shaping electrode holder 4 made high obturation plate 2B and peripheral wall 4A which counters, and has prevented the location gap of a printed circuit board 5. As for this shaping electrode holder 4, width of face (W) is specified in the height of peripheral wall 4A.

[0023] The shaping electrode holder 4 of this configuration also arranges a printed circuit board 5 in the orientation of a cell 2. If a printed circuit board 5 is connected with electrode 2C of the positive/negative of a cell 2 through the PTC component 6 and the lead plate 7, a printed circuit board 5 will hold the shaping electrode holder 4 in an orientation. The shaping electrode holder 4 is inserted to the resin shaping section 1, and is fixed to an orientation. Therefore, a printed circuit board 5 just holds the shaping electrode holder 4 temporarily in an orientation until it fabricates the resin shaping section 1. However, it can paste up and a printed circuit board 5 can also be fixed to the shaping electrode holder 4.

[0024] The resin shaping section 1 is the process which fabricates synthetic resin, and inserts an output terminal 3, the shaping electrode holder 4, and a cell 2. An output terminal 3 is fixed to a printed circuit board 5. Therefore, the resin shaping section 1 inserts an output terminal 3 with a printed circuit board 5. The pack cell of drawing lays the whole cell 2 underground, and does not insert it to the resin shaping section 1. A cell 2 is inserted in the condition of sticking the front face by the side of a heights electrode in the resin shaping section 1. This pack cell has the features which can make an appearance small. However, a part of cell can be inserted so that it may twist and carry out and the whole may be mostly laid under the resin shaping section, and it can also be firmly used as the pack cell of tough structure.

[0025] The resin shaping section 1 of drawing 4 and drawing 6 consists of connection section 1B which connects edge covering section 1A arranged in the location which covers the both ends of a cell 2, and edge covering section 1A of a pair, and fabricates the whole in one. Insert molding of the edge covering section 1A located in the heights electrode, i.e., obturation plate 2B, side of a cell 2 is carried out in the condition of laying the edge of a printed circuit board 5, the shaping electrode holder 4, and a cell 2 underground. Edge covering section 1A located in the pars basilaris ossis occipitalis of sheathing can 2A is fabricated by the configuration which meets a periphery at the bottom in the pack cell of drawing 3 and drawing 4 , and is fabricated by the configuration which covers the whole surface at the bottom, i.e., a base configuration, in the pack cell of drawing 5 and drawing 6 .

[0026] Connection section 1B is located in the corner section of sheathing can 2A of a cell 2. The cell 2 of drawing 4 and drawing 6 is a thin square shape cell which beveled the corner section of sheathing can 2A, and is arranging connection section 1B in the corner section beveled and made. The pack cell of

drawing 3 is arranging connection section 1B in the corner section which serves as the sheathing can 2A bottom in drawing, as shown in the sectional view of drawing 7 . The pack cell of drawing 5 is arranging connection section 1B in the corner section on sheathing can 2A, as shown in the sectional view of drawing 8 . Connection section 1B is arranged in the corner section of beveled sheathing can 2A, without enlarging the appearance of a pack cell. Although the resin shaping section 1 shown in drawings, such as this, has connected edge covering section 1A of a pair by connection section of two 1B, it can prepare the connection section in the four corners of a sheathing can, and can also connect the edge covering section of a pair in the four connection sections.

[0027] The above pack cell is the following, and is made and manufactured.

(1) Fix the electronic parts (not shown) of an output terminal 3 and a protection network to a printed circuit board 5.

(2) Connect a printed circuit board 5 with a cell 2 through the lead plate 7 and the PTC component 6. The PTC component 6 is arranged between the shaping electrode holder 4 and a cell 2. Spot welding of the PTC component 6 and the lead plate 7 is carried out to the lead plate 7 which carried out spot welding of the end to the cell 2, connected it with it, and has connected the other end with the printed circuit board 5, and they are connected with it. When a printed circuit board 5 is connected with a cell 2, the shaping electrode holder 4 is arranged between a printed circuit board 5 and a cell 2. A printed circuit board 5 and a cell 2 do, and the shaping electrode holder 4 connects a printed circuit board 5 and a cell 2 with an exact relative position. At the above process, a printed circuit board 5, the shaping electrode holder 4, and a cell 2 are connected in one, and serve as cell assembly.

[0028] (3) Carry out [mold clamp] of the metal mold after setting cell assembly to the shaping room of metal mold. The metal mold 10 by which it was mold clamp carried out has the opening 12 for fabricating the resin shaping section 1, as shown in drawing 9 thru/or drawing 12 . The synthetic resin by which was heated and melting was carried out to this opening 12 is poured in, and the resin shaping section 1 is fabricated. The synthetic resin by which melting was carried out is poured in from inlet 10A by which opening was carried out to metal mold 10. Inlet 10A is opened for free passage and prepared in the opening 12 of the shaping room 11. Furthermore, metal mold 10 has the positioning heights 13 which carry out the temporary stop of the cell assembly to an orientation. The positioning heights 13 contact the front face of the shaping electrode holder 4 or a printed circuit board 5, and carry out the temporary stop of the cell assembly to an exact location.

[0029] Drawing 9 and drawing 10 show the sectional view of metal mold 10 which manufactures the pack cell of drawing 3 . Drawings, such as this, show the condition that the positioning heights 13 of metal mold 10 press the front face of the shaping electrode holder 4, and carry out a temporary stop to an orientation. The positioning heights 13 of drawings, such as this, fasten the shaping electrode holder 4 by the upper and lower sides, and prevent a location gap of the upper and lower sides. Furthermore, the shaping electrode holder 4 makes an upper square corner contact the inside of the corner section of metal mold 10, as shown in drawing 10 , and a gap of a longitudinal direction is prevented. The metal mold 10 of drawing makes the bottom of a cell 2 contact the inside of the shaping room 11 of metal mold 10, and prevents a location gap of the lengthwise direction of cell assembly further again while it presses the front face of an output terminal 3 by the positioning heights 13. The positioning heights 13 which press the front face of an output terminal 3 make the exterior of the resin shaping section 1 express an output terminal 3.

[0030] Drawing 11 and drawing 12 show the sectional view of metal mold 10 which manufactures the pack cell of drawing 5 . The positioning heights 13 of metal mold 10 press the front face of an output terminal 3, and drawings, such as this, show the condition of carrying out the temporary stop of the shaping electrode holder 4 to a printed circuit board 5 in an orientation. The metal mold 10 of drawings, such as this, makes the inferior surface of tongue of the shaping electrode holder 4 contact the inside of the shaping room 11 of metal mold 10, and prevents a location gap of the vertical direction of a printed circuit board 5 and the shaping electrode holder 4 while it presses the front face of an output terminal 3 by the positioning heights 13. Furthermore, as the shaping electrode holder 4 is shown in drawing 12 , the lower square corner section serves as a configuration in alignment with the inside of the corner section of metal mold 10, and a location gap of a longitudinal direction is prevented. The positioning heights 13 which press the top face of a printed circuit board 5 press the front face of an output terminal 3, and make the exterior of the resin shaping section 1 express an output terminal 3. The metal mold 10 of drawing 11 presses the bottom of a cell 2 by the positioning heights 13 of metal mold 10, and prevents a location gap of the lengthwise direction of cell assembly further again while it makes lobe 4D which projects from the apical surface of the shaping electrode holder 4 contact the inside of the shaping room 11 of metal mold 10.

[0031] (4) Press fit the synthetic resin by which melting was heated and carried out to the shaping room 11. Melting synthetic resin trespasses upon the opening 12 of the shaping room 11, and the resin shaping section 1 is fabricated. The fabricated resin shaping section 1 is fabricated in one by the configuration

which has connected edge covering section 1A by connection section 1B. One edge covering section 1A inserts a printed circuit board 5, the shaping electrode holder 4, and a cell 2, and fixes them to an orientation. Preferably, edge covering section 1A which inserts the shaping electrode holder 4 and is fixed trespasses upon the interior of the tubed shaping electrode holder 4, and fixes the shaping electrode holder 4 firmly. In order to pour the synthetic resin of edge covering section 1A into the interior of the shaping electrode holder 4, the clearance 8 which shows the shaping electrode holder 4 to melting synthetic resin inside is formed. However, it is not necessary to make melting synthetic resin not necessarily trespass upon the interior of a shaping electrode holder. The metal mold 10 of drawing 9 and drawing 11 fabricates edge covering section 1A so that it may become both sides of a cell 2, and the same flat surface. The whole thickness is made as for the pack cell which fabricates the resin shaping section 1 with this metal mold 10, and is manufactured to the same thinness as a cell 2. However, metal mold can also be fabricated in the condition of laying a cell under the resin shaping section. This metal mold carries out the temporary stop of the cell to an orientation by positioning heights, and fabricates the resin shaping section.

[0032] (5) At the above process, cell assembly inserts an output terminal 3, a printed circuit board 5, the shaping electrode holder 4, and a cell 2 to the resin shaping section 1, and fixes them to an orientation. Then, it becomes the pack cell which covered the front face of this cell assembly with the tube 9, and was completed. Heat-shrinkable tubing is used for a tube 9. After heat-shrinkable tubing puts in cell assembly, it heats and contracts and it is stuck on the front face of cell assembly.

[Translation done.]

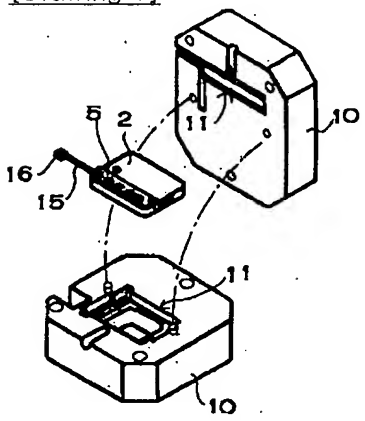
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The perspective view showing the production process of the conventional pack cell
[Drawing 2] The sectional view showing the production process of a pack cell which makes the exterior of the resin shaping section express an output terminal
[Drawing 3] The perspective view of the pack cell concerning one example of this invention
[Drawing 4] The decomposition perspective view of the pack cell shown in drawing 3
[Drawing 5] The perspective view of the pack cell concerning other examples of this invention
[Drawing 6] The decomposition perspective view of the pack cell shown in drawing 5
[Drawing 7] The cross-sectional view showing the connection section of the resin shaping section of the pack cell shown in drawing 3
[Drawing 8] The cross-sectional view showing the connection section of the resin shaping section of the pack cell shown in drawing 5
[Drawing 9] Drawing of longitudinal section showing the metal mold which fabricates the resin shaping section of the pack cell shown in drawing 3
[Drawing 10] The cross-sectional view showing the metal mold which fabricates the resin shaping section of the pack cell shown in drawing 3
[Drawing 11] Drawing of longitudinal section showing the metal mold which fabricates the resin shaping section of the pack cell shown in drawing 5
[Drawing 12] The cross-sectional view showing the metal mold which fabricates the resin shaping section of the pack cell shown in drawing 5
[Description of Notations]
1 -- Resin shaping section 1A -- Edge covering section 1B -- Connection section
2 -- Cell 2A -- Sheathing can 2B -- Obturation plate
2C -- Electrode
3 -- Output terminal
4 -- Shaping electrode holder 4A -- Peripheral wall 4B -- Middle connection section
4C -- Insertion section 4D -- Lobe
5 -- Printed circuit board
6 -- PTC component
7 -- Lead plate
8 -- Clearance
9 -- Tube
10 -- Metal mold 10A -- Inlet
11 -- Shaping room
12 -- Opening
13 -- Positioning heights
14 -- Resin
15 -- Lead wire
16 -- Connector

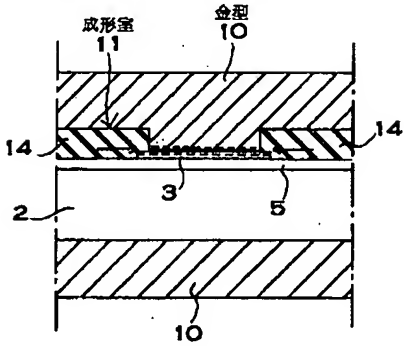
[Translation done.]

DRAWINGS

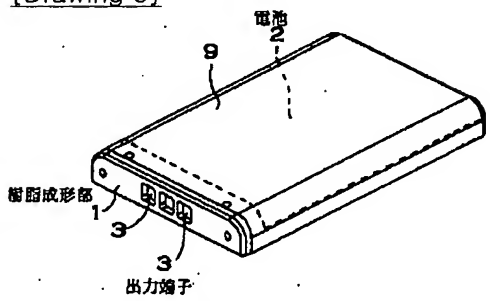
[Drawing 1]



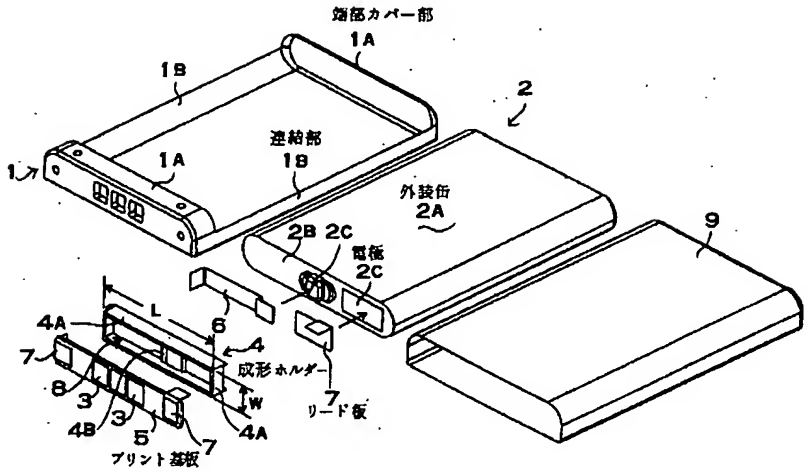
[Drawing 2]



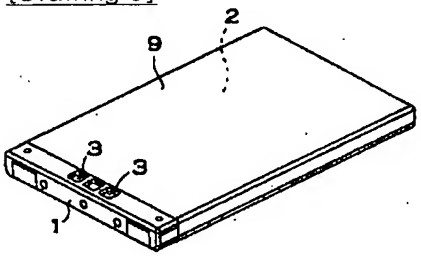
[Drawing 3]



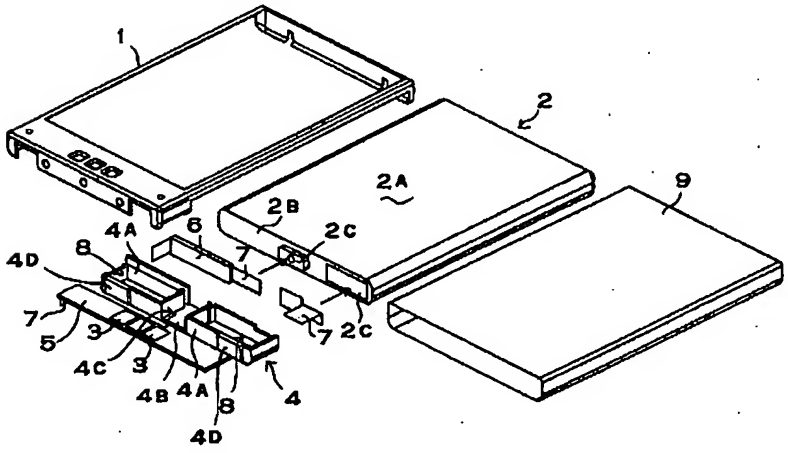
[Drawing 4]



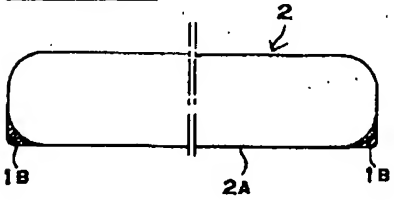
[Drawing 5]



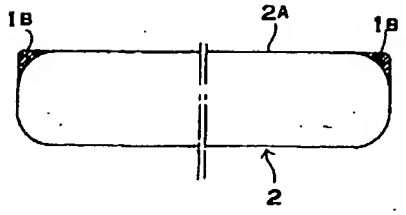
[Drawing 6]



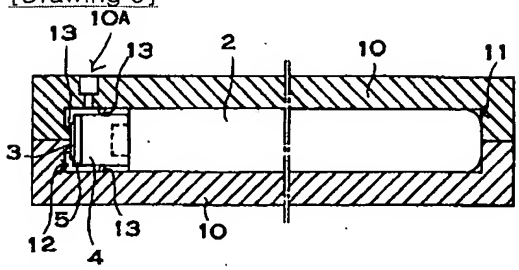
[Drawing 7]



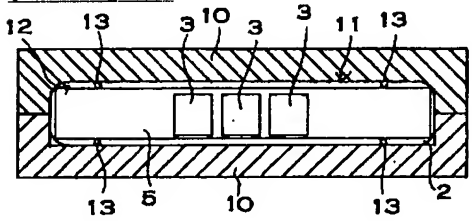
[Drawing 8]



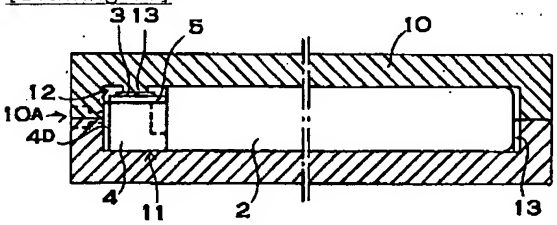
[Drawing 9]



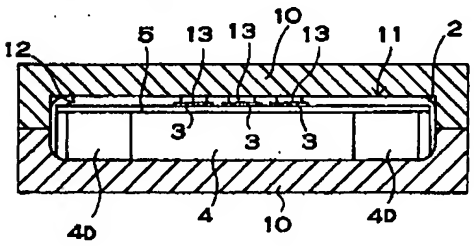
[Drawing 10]



[Drawing 11]



[Drawing 12]



[Translation done.]